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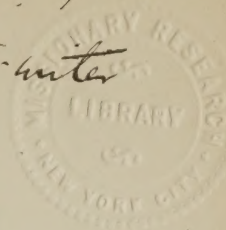
MEMORANDUM

EMPLOYMENT OF THE FORPS OF ROYAL INFANTRY INDIA

REPORT OF THE COMMISSIONER OF THE ARMY
IN THE FORM OF A

BY MAJOR G. GIBSON, R.E.

Sir Baillie Lene K.C.B. & C.S.I.
(Private.) *from Reuter*



MEMORANDUM

ON THE

EMPLOYMENT OF THE CORPS OF ROYAL ENGINEERS

IN

INDIA

SUBMITTED TO THE CHAIRMAN OF THE MILITARY COMMITTEE
OF THE COUNCIL OF INDIA.

BY MAJOR G. CHESNEY, R.E.

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MEMORANDUM

REPORT OF THE COMMISSION

ROYAL ENGINEERS

1900

REPORT OF THE COMMISSION
ON THE PROGRESS OF THE
WORK DURING THE YEAR 1900

BY THE COMMISSIONERS

PRINTED BY THE GOVERNMENT OF CANADA

MEMORANDUM.

PERHAPS it may be as well to premise, in explanation of the appearance of this Memorandum, that the writer for some years had immediate charge of the Establishment Branch of the Indian Public Works Office, under the Secretary to the Supreme Government, in which capacity it was his duty to initiate the various proposals needful to be brought forward from time to time connected with departmental organisation. Subsequently, as head of the Public Works Account and Finance Department, he necessarily continued to be employed both in initiating and advising upon matters of the same kind. The Royal Engineers serving in India being mainly employed under the Public Works Department, their interests while in that country are intimately bound up with the condition of that department, and thus departmental questions can hardly be touched on without including corps matters also. Lastly, it will perhaps be deemed sufficient apology for entering on the subject, that the Royal Engineers serving in India have not only no recognised official head in that country, but have not even a local staff-officer as a medium of communication between them and the regimental authorities. Thus it has happened that the initiation of proposals affecting the corps has necessarily often fallen to be made by those like myself, whose claim to speak is derived only from their official position in a civil capacity.

The Memorandum now submitted has reference to two matters; first, the pressing demand for an immediate supply of Engineers for India; secondly, the general subject of the employment of the corps of Royal Engineers in that country. These will be dealt with separately.

I. IMMEDIATE DEMANDS OF THE INDIAN PUBLIC WORKS FOR SUPPLY OF ENGINEERS.

The great demand which has lately arisen for engineers for Indian service is due to two causes. What used formerly to be an abundant channel of supply has of late almost dried up. At one time the Indian army supplemented the corps of Engineers to almost any required amount; but, first, the imposition of a strict professional test, and next, the great reduction lately made in the strength of that army, accompanied by the increased pay and improved prospects now offered by other branches of the Indian service—notably the salaries now attached to employment with

the native army—tend to invite candidates for special employ to other lines. The result is that the recruits for the department from this source now amount to only about three or four a-year.

But the main reason why more engineers are wanted is the enormous extension of public works in India now taking place. The expenditure on this head is already threefold what it was ten years ago, and continues constantly on the increase,* and the progress of improvement is at present mainly limited by the want of a sufficient staff to carry out the different projects matured and in preparation. It is under these circumstances that the requisition of the Government of India has been received for a large and immediate increase to its engineering establishment, and in making their application, it was stated to be especially desirable that the existing proportion of military members of the department should be maintained. At present the civil and military members are nearly equal in number, about one-half of the latter being engineer officers, and the rest belonging to other branches of the army. But these elements are very unequally distributed. The department ten years ago was almost wholly military, and since that time it has been mainly recruited by civil engineers, so that the majority of the upper ranks belong to the former class, and by far the greater part of their juniors to the latter; and since, as has been already explained, one of the two military elements is practically no longer existent, it was evident that unless some special measures were taken to supply its place, as well as to meet the demand for additional engineers required by the expansion of the department, the existing order of things must rapidly be disturbed. It was under these circumstances that the Indian Government asked that a considerable number of young Royal Engineer officers might be furnished at once.

Now the present establishment of Royal Engineers in India being a fixed one—viz. 7 battalions of 48 officers each, or 336 in all—an increase of this strength, which the Indian Government desired should proceed *pari passu* with the requisite expansion of the aggregate departmental staff, would involve an augmentation of the corps. But as the effect of such a measure would not be immediately felt, since the young officers commissioned in such a case would not be available for Indian service until they had passed through the Chatham course of practical instruction, the requisition of the Indian Government could only have been at once complied with by a transfer to India of a portion of the establishment of the old or British corps, which is now employed in Great Britain and the colonies. This proposal, however, it is understood, was declined by the authorities at the Horse Guards, on the ground that a temporary reduction of the part of the regiment employed out of India was not feasible, all these officers being fully employed. In consequence of this decision the Indian Government, as an augmentation of the department in some form was necessary, asked as an alternative arrangement that a large additional number of civil engineers might be sent out.

* The estimate for the coming year, which has just reached England, amounts to 8,000,000*l.* sterling, or nearly 1,000,000*l.* more than that of 1868–69.

The following arrangements have accordingly been made :—

a. Thirty civil engineers of standing and professional experience were sent out in February last, under a covenant for five years' service.

b. Fifty more have just been sent out on the same terms. These were on the whole younger men than the first batch.

c. In addition to the annual competitive examination for civil engineer appointments held at the India Office in July 1867, when twenty-five candidates were appointed, a special examination was held in December last, when sixteen more were sent out, and at the annual examination held last July, the number of appointments to be competed for was raised to forty. Only twenty-two of the candidates however succeeded in passing the minimum test, and that number was appointed.

d. Another examination has just been held, when forty more appointments of assistant engineers were offered to competition.

Thus the condition in which the Indian Government desired to maintain the department is rapidly changing. The establishment of Royal Engineers serving in India is, as above stated, a fixed quantity, and of the 336 officers composing it only about 200 are available for the Public Works Department, the remainder being engaged on the Survey Department, or with the corps of sappers, or on special duties, or young officers under instruction at Chatham. A slight augmentation has however lately been made to the above strength; about twenty officers who are employed out of the regular line of the department have been seconded or made supernumerary, and their places filled up. About fifteen more are to be seconded at some future time. The other military officers serving in the Public Works Department are now less than 100, and this number is likely to diminish gradually. On the other hand, to the civil members, who numbered about 300 at the beginning of last year, 143 have been added since, besides the passed students appointed from the Indian training colleges—perhaps twenty more. Several civil engineers have also been taken into employment by the Indian Government on the spot, chiefly from the staffs of the local railways.

It will thus be apparent that the constitution of the department is undergoing a rapid change. Already the ratio of military to civil engineers has been reduced from one of equality to that of six to nine, and since the ultimate demands of the public works for additional agency have been by no means satisfied, the change will be eventually still greater, if measures be not taken to prevent it.*

* *Composition of Indian Public Works Department.*

	February, 1867.	November, 1868 (approximate).
Royal Engineer officers	204	224
Military officers not Royal Engineers	94	94
Civil Engineers	304	447
Total	602	765

I will not here enter on the question whether or not the change is desirable; the strongly expressed opinion of the supreme government in India may be accepted as conclusive on this point. The object of this part of my note is to draw attention to the fact that there is a practical limit to the recruitment of the department in the way lately adopted, and to submit for consideration whether it may not still be practicable to obtain the immediate services of some additional Royal Engineers.

As to the first point, it seems quite clear that an indefinite number of competent civil engineers is not to be got on the terms the government is prepared to offer. It certainly so happened that in the present state of suspension of professional operations in England, an unusual number of candidates came forward for the appointments lately offered, and among them some highly competent men. But it is probable that the best of these had been accustomed to occupy much higher professional positions, and accepted the situations now offered simply because no other occupation was to be had. It seems doubtful if under the ordinary conditions of engineering progress and employment in Europe, the required number of qualified men would have been forthcoming; at any rate, it will probably be admitted that there are limits beyond which it is not desirable to recruit a government department in this way, while there are obvious objections against filling up a great branch of the public service with permanent members, except at the bottom of the list. The other source of supply, in the way of young civil engineers, is also strictly limited. The proposed open competition for the appointments annually offered is merely nominal, for since the practice was first established in 1859, in hardly a single instance has the number of candidates who succeeded in passing the prescribed minimum standard been in excess of the ten or twelve appointments offered, it has frequently been below it. Nor will more men be obtained merely by increasing the number of appointments offered to competition. Of the forty appointments offered last July, only twenty-two were taken up; at the examination just ended only forty-four candidates came forward for the forty appointments offered, and only twenty succeeded in passing the minimum test. The fact seems to be that the present state of professional education does not afford the means for preparing candidates in the theoretical principles of the profession, while it is only in that part that a competitive examination can properly test their qualifications; that a man's practical knowledge can be ascertained effectually in this way is impossible.

Even if the full number of qualified candidates could be obtained in this way, it is surely undesirable to fill up a great public department with men who can just succeed in scraping through what, compared with the test required in the Indian government colleges, to say nothing of the much higher standard required in the case of Royal Engineer officers, is a very moderate ordeal.

This then is the state of the case. On the one hand, the agency which the government of India wants to have is not being supplied, while to make good the deficiency the standard of capacity which

it was desired the department should maintain, is undergoing a rapid deterioration.* Even when this is done, the number of men required is not forthcoming. On the other hand, in the corps of Royal Engineers there is to be had a large supply of young officers who have been selected by what is really a very severe competition; first, on admission to Woolwich, subsequently on obtaining their commissions, and who have afterwards gone through what is now a very complete course of practical training at Chatham, extending over two years. Here then is an agency perfectly adapted to the purpose, which could make good the numerical deficiency in the departmental staff to almost any required extent, without any lowering of the standard of qualification, and which the Indian government has expressed itself most desirous to have appointed.

The difficulty in the way of carrying out an arrangement which all parties concerned are unanimous in desiring, is that the young officers on the British establishment cannot be spared from their other duties. It may be, however, that the authorities who raised this objection were not aware of the urgency of the case. In a later part of this note some considerations will be offered on the importance, both in the interest of the corps and the state, of occupying the admirable field which India presents for the employment of its engineer officers on works of extraordinary interest and importance. But assuming here that all parties are agreed on this point, what may be especially urged now is that such a time as the present is not likely to recur. If the great augmentation now required for the Indian Public Works department is once filled up in other ways, the matter will be practically disposed of. Now or never is the time to take advantage of the opportunity presented. The real question at issue therefore seems to be not so much whether 40 or 50 Royal Engineers can be *conveniently* spared, as whether they can be spared at all, under a great and pressing emergency. It must be admitted that the demand has arisen at a time peculiarly favourable; England is at peace with all the world, and the great fortifications, on account of which I believe the corps was augmented in 1859, are approaching completion. If ever, then, there was a time when a part of its strength could be withdrawn for other employment, it is surely the present. As to the number that could be spared, or the extent of inconvenience that might be caused, it is not for me to offer an opinion; but while the occasion is one for which it would appear quite worth while to make a considerable sacrifice, it is surely a fair assumption that the corps is from the very nature of its organisation not working at full power during peace time. Organised primarily for purposes of war, its employment during peace time is presumably, like that of the rest of the army, more or less of a provisional nature. This much at least is certain, that were a war to arise, any number of engineers that

* I say this, because it may be taken for granted that when these competitive examinations were first established a supply of picked men was looked for; it was never expected that they would become a mere pass test.

might be required would as a matter of course be made available for active service. No question would then be raised as to the obligations of routine peace duties on their services. But next to the outbreak of a war, there could hardly be a more urgent case than the present, the progress of the great public works of India being seriously impeded for want of an engineering staff, or at the best the Indian government compelled to resort to a confessedly inferior agency.

Is it impossible, then, I would respectfully ask, that the authorities at the Horse Guards should be asked to reconsider their first opinion, and under the emergency of the case, to lend at least a portion of the officers now wanted for service in India?

It is perhaps not impossible that the difficulty which has been raised in meeting the application of the Indian government may have been partly due to the way in which it was put. Forty young officers were asked for. To supply these, while the strength of captains and field officers on the home establishment remained un-reduced, might no doubt have caused embarrassment, since the system of the Royal Engineer department is based on the employment of the different ranks of the corps in certain fixed proportions, and might be thrown out of gear by the withdrawal of a large number of officers from the junior grade only. Moreover, only the minimum of relief would have been afforded to the Imperial estimates by transferring subalterns, while it is this class for which employment is most easily found at home. But in limiting their application to young officers the Indian government may have wished rather to indicate the agency it would on the whole prefer, than to place any absolute limit on the standing and rank of the officers to be supplied. No doubt in a general way young officers who can be employed at first in a subordinate capacity while learning the special conditions of Indian engineering are *ceteris paribus* the best agency for augmenting the P.W. department; but were it a question between getting Engineer officers of all grades, or getting none at all, there can hardly be any doubt about the answer. The best way of recruiting the *civil* branch of the department has been pronounced to be by young engineers, either from the government college or appointed by the India office, who enter the department on probation at the bottom, and gradually work their way upwards; but on the failure of this method to furnish a sufficient supply for present emergencies, a large number of older engineers has just been sent out, that is, men of the same age as the captains and lieutenant-colonels of the Royal Engineers. There would be a manifest inconsistency under these circumstances, in raising an objection to the employment of the latter in India: indeed, in choosing between the two, it may be presumed the Indian government would prefer that the department should now be strengthened by those who have already been trained in the discipline and method of government service than by those whose previous employment has been with contractors or private companies. No doubt it is an advantage to an engineer in India to be familiar with the country; but the history of Indian railway

construction shows that this experience is not a necessary condition: at any rate in the present case there is no choice on this head, men of Indian experience are not to be got.

Under these circumstances it is respectfully suggested as deserving of consideration, that the Horse Guards might be asked to supply the required number of engineers from the British establishment of the corps, in the usual proportion of field officers, captains, and subalterns, as a temporary arrangement, and pending the final settlement of some definitive plan for supplying Indian demands, with the understanding that they should be at once withdrawn again, if required for emergent Imperial purposes, as *e.g.*, in the contingency of England becoming engaged in a European war.

Aid of this kind could perhaps not be afforded all at once to the full extent required; the demand, it may be presumed, could only be met by a temporary readjustment of the stations occupied by officers, and reduction of the engineer establishment in the colonies as well as at home, which might require some time to carry out; but probably very considerable help might be afforded during the present season from the staff serving at home.

Further, there is the large body of young officers under instruction at the Chatham establishment. Everyone who remembers, as I do, how defective the Chatham course was in former days, how much that was done was either useless or slurred over, and how much that ought to form part of a scientific engineer's education was omitted, would be loth to see curtailed what is admitted to be now an excellent course of instruction. But the present case being one of a comparison of claims, it might be asked whether the extreme urgency of the public works in India could not be deemed sufficient to justify a temporary curtailment of that course, so as to yield an immediate additional supply of young officers available for employment, both for India, and to take the place of senior officers temporarily transferred to that country. It may be remembered that those sent to India, if they would thus lose a part of the Chatham training, would also enter the sooner upon the valuable practical training afforded by the Indian Public Works.

PART II.—ON THE EMPLOYMENT OF THE CORPS OF ROYAL ENGINEERS IN INDIA.

THE three corps of Indian Engineers have since their first formation, at the end of the last century, been chiefly employed during peace time upon the Indian Public Works, only a very small fraction of the officers being retained on military duty with the Sappers, and a few attached to the Trigonometrical Survey. Thus the duties of the Public Works Department have come gradually to be regarded as almost identical with the duties of the Engineer corps. An engineer officer on completing his course of one year's regimental duty after first arrival in India, or on his return from leave, is as a matter of course placed at the disposal of the Public Works Secretariat,* and an officer employed in any other capacity, save the very few attached to the Indian Sapper Corps and Survey, is deemed to be out of the regular line. By the abolition of the Indian Corps in 1861 this state of things was altered but little, the so called amalgamation of the Indian and British forces having been carried out very differently as regards the European Cavalry, Infantry, and Artillery, and the Engineers. The Cavalry and Infantry of the Company's European forces were added to the British army as so many additional regiments. The brigades of Indian Artillery were in like manner added to the Royal Artillery, and officers and men now take their tour of English duty, and are in all respects on the same footing as the old royal regiment, except that they are borne on separate lists for purposes of promotion, and retain their claims to Indian rates of pension. But the officers of Engineers continue to be employed wholly in India on precisely the same conditions as before. They are not eligible for service in England, and are unrepresented either at home or in India by any staff, being still wholly employed under the civil government, with the exception of the small quota, principally junior officers, attached to three Sapper corps.

So far, therefore, as the officers of the three Indian corps of Engineers are concerned, the effect of the measure has been limited to the compliment bestowed on them of commissions in the Royal Engineers. But the ultimate effect of the amalgamation upon the latter is likely to be very great indeed, and it is because the importance of its bearing on the future of the corps has not, as I venture to think, been sufficiently apprehended, nor adequately provided for, that the following considerations are respectfully submitted.

The amalgamation measure provides that the three Indian

* The business of the Supreme Indian Government is transacted in five Departments or Secretariats—Finance, Home, Foreign, Military, and Public Works, being conducted in each case by a secretary and staff. But the term *Public Works Department* is also given to the collective body of executive officials employed on the public works.

Engineer regiments shall be suffered gradually to die out, appointments being made to the British corps in succession to the vacancies which occur in them, so that while the aggregate strength of the Engineer Corps will remain constant, first the subalterns, then the captains, and lastly the field officers, will eventually belong to one amalgamated list. Further, it is provided that the proportion of charge borne by the British and Indian revenues shall remain unaltered, so that for every vacancy occurring in the Indian battalions, an officer of the amalgamated corps is attached to the Indian establishment, and thus the strength of the corps serving at home and in the colonies remains unaffected by this change. Already one-half of the subalterns serving in India belong to the amalgamated list.

Further, it has been provided that the Royal Engineers employed in India shall be placed at the disposal of the Indian government, and employed in the same way as the Indian engineers have heretofore been employed, that is, mainly on the Public Works. Unless they were to be so employed, there would be no necessity for maintaining the Indian establishment at its present strength, since no adequate military duties could be found for a large body of military engineers in peace time. Nor could the Indian government forego their services without inconvenience. Thus, while the business of that government has been provided for uninterruptedly, the only change in this respect having arisen in the substitution of Royal for Indian officers, a very momentous change has come over the condition of the corps of Royal Engineers. Whereas hitherto that corps has been employed entirely at home or in the colonies, and with special exceptions, entirely as a military body under the orders of the War Department, for the future nearly one-half* of the regiment will be serving in India, and serving in a purely civil capacity under a civil department of the government.

While however, India has thus become a principal station for the Royal Engineers, and employment in the Public Works Department a recognised part of their duties, the arrangements made for carrying out the change appear to be still of a somewhat provisional kind. Of the officers serving in India, all who are employed in the Public Works Department, that is, almost the whole number, are now to be seconded. Their places, however, are not to be filled up, but their names are entered in the Army List in italics, as if to mark that they have quitted for the time the regular line of corps duty. Thus eventually, when the officers

* At the time of the amalgamation the British and Indian regiments were nearly of equal strength, consisting of $7\frac{1}{2}$ and 7 battalions, of 360 and 336 officers respectively. Subsequently the British establishment was augmented by half a battalion, the promotions being made in that branch. It has been the practice also in the latter to second or make supernumerary all officers employed on other than the regular duties of the regiment. The officers so seconded make up nearly the strength of an additional battalion, and as they belong principally to the senior grades, the tendency of the arrangement is towards a somewhat more favourable rate of promotion in this branch of the corps. The same practice is however now in course of being gradually applied to the Indian branch.

of the old Indian regiments are replaced by men of the amalgamated list, nearly one-half of the regiment will be seconded. Although not *hors cadre*, they will be regarded as employed extra regimentally, and the legitimate duty of the corps will still be deemed to be that on which only about one-half of it is engaged. To which may be added, although they are comparatively minor points, the exceptional state in which all engineer officers in India now find themselves, without any regimental head or representative—without even so much as a staff-officer for collecting the regimental returns, and also the undefined position of officers of the old Indian regiments on leave, with respect to the India Office and Horse Guards, they being at present deemed to be ineligible for the benefits enjoyed by either the British or Indian service.

This anomalous condition of things would, I submit, be deserving of attentive consideration, even were it to continue to be applicable to only the smaller half of the regiment. But there can hardly be any doubt that if the corps organisation can be adapted to meet adequately the demands likely to be made upon it for service in India, this proportion would soon be entirely altered. Within the last year the Public Works Department has been augmented by about 150 engineers, the majority of whom might have been Royal Engineers, if the arrangements of the corps had admitted of compliance with the strongly urged wishes of the Indian Government. There is every reason to suppose that this increase of the departmental operations will not stop until much wider limits have been reached; so that the Indian service offers the prospect of a field of almost indefinite extension, for employment of a most important and interesting kind, if only the corps be made available to embrace the opportunity thus presented to it. Believing that the arrangements of the corps system need some modifications to make them thoroughly suitable for its altered conditions, and that such modifications would be neither complicated nor difficult to carry out, I venture to draw attention to the matter.

The subject may be regarded from two points of view: we may consider its bearing on the interests of the State; and there is to be considered also its effect on the engineer corps, this last element being however necessarily bound up indirectly with the other, since the State is of course interested in maintaining or improving the efficiency of this large body of public servants. On the first point, indeed, it might seem almost superfluous to say anything, since the opinion of several viceroys in succession, and of almost all the members of the Indian Government during late years, has been expressed in the strongest terms as to the importance of maintaining the agency of the military engineers for its public works. At any rate, it will not be necessary here to do more than state a few of the most palpable and prominent reasons on this head.

There is first of all the sufficient reason that it cannot be well to make a radical change in the organisation of a great department which has proved highly successful, without sufficient cause being shown. In the present case, not only has no such cause been shown, but all parties interested in the matter are strongly in

favour of maintaining that organisation intact; and the great change of displacing the military engineers from their present place as the leading part of the staff on the Indian public works, if it finally happen, will confessedly occur, not because the government desires it, but simply because engineer officers are not to be had. But further, a very little consideration should suffice to show that this agency ought to be the most efficient which the government can obtain. It has indeed not been uncommon to hear it alleged that military engineers are by habits and training less qualified to execute civil works than civil engineers. If this means that a military engineer without previous experience, placed suddenly in charge of civil engineering works, will be less fitted for the task than a man of the same age who *has* had experience, then of course the remark is an obvious truism. But that there is any necessary opposition between the sort of knowledge acquired by the two classes is, it need hardly be said, quite a mistaken supposition. The difference is one of degree, not of kind. The sort of examples people indeed would seem to have in view when they discuss the comparative merits of 'mere military engineers' and 'regular civil engineers' is that of an engineer officer on the one hand, who has passed his life in the routine duty of the barrack department in England and the colonies, and a Stephenson or Brunel on the other, engaged from early youth on the most varied and important undertakings; and it need hardly be said that, as regards the Indian Public Works Department, such a way of putting the case is utterly inapplicable. If, indeed, picked civil engineers of proved ability and English experience, could be brought into the service periodically, doubtless such men would have their special kind of superiority. But such an arrangement is not practicable. The leading civil engineers would not accept government service on the salaries it offers; moreover, every great public department must as a rule be recruited at the bottom, and in the case of the Indian Public Works Department, the necessary conditions are, that all the members of it must enter young, and obtain their practical experience as engineers in India. So far, therefore, as experience in the practice of engineering is concerned the conditions are precisely the same for both the military and civil engineer; this experience has to be obtained on the Indian Public Works, and both classes have the same advantages, and both are subject to the same drawbacks of being employed on work which is often of a scattered kind, and carried on at a distance from the great centres of professional observation and criticism. It is only in the previous training and qualifications of the two classes that any difference is to be found, and this is very considerable.

The civil engineers of the department are obtained from two sources:—1. Students of the Indian civil-engineering colleges; 2. Candidates appointed in England by the secretary of state. As regards the first, there can hardly be any doubt as to the propriety, not to say obligation, of throwing open the department to natives of the country; but for some time to come at any rate the number of those qualifying for employment is likely to be but small.

Besides natives, these colleges are also open to European and East Indian youths; the test for qualification is one of fair difficulty, and the course of surveying especially, carried out under the supervision of the college staff, is thorough and complete; these appointments afford an excellent provision for the sons of officers and other deserving servants of government who cannot afford to give them an English education, and in this way a body of engineers has been added to the department, who have been brought up looking forward to an Indian career, and some excellent public officers have thus been obtained. But, of course, students trained wholly in India are in some respects placed at a disadvantage, and at any rate the number available from this source is necessarily but limited.

The young engineers appointed from England are ostensibly chosen by open competition, but virtually by what is, as has already been explained, a mere 'pass' examination, while this test has been fixed at a much lower point than is established in the government colleges. Practically, any young man who chooses can secure one of these appointments by going through a prescribed term of probation of three years' study and practice, and passing an easy examination. Even if the competition were severe, the system appears so far defective that, in a brief examination, the candidate's acquaintance with some of the most important parts of an engineer's education—his practical knowledge of work and surveying—cannot be tested properly, while in theoretical engineering there is not much scope for examination, since this is a subject in which, under the present system of professional training, the pupils of civil engineers receive ordinarily no methodical instruction, but are left to pick up their knowledge as best they may.* But as matters now stand, in the absence of any competition, the result is that while among the men who enter the service through this channel there are of course many of ability, as indeed there would of course be were they appointed without any test whatever, the system fails to ensure that all shall be of fair average proficiency. It equally fails to ensure that they shall have had a good practical training; the mere fact that a pupil has been articled to an engineer, is no evidence that he has turned his opportunity to advantage, nor does it follow that a civil engineer taking pupils should have necessarily the means of giving them a practical training.

* At the same time the examinations as now carried out, aim at testing the candidate's practical knowledge and experience, which I conceive to be impracticable, while of the theoretical subjects which could be tested by examination—the theory of civil engineering and applied mechanics, it takes no note. If, however, this line of test were adopted the candidates would be driven to crammers for preparation, the ordinary conditions of pupilage not affording the means for it.

The difficulty of the case suggests the idea whether it would not be worth while to establish a regular school for the young civil engineers intended for India, where they could receive a sound professional education, and a thorough course of surveying gone through under supervision. There is no royal road to this branch of engineering, and it is one in which a man appointed under the present plan may be almost ignorant. It would be easy to arrange also that the students should get a practical acquaintance with works. An invaluable result of such an establishment would be the esprit de corps it would tend to foster, and an identification of its alumni with the interests of Government, a thing very much wanted in the department at present.

On the other hand, the military engineers first undergo a very severe competition for admission to Woolwich, and there is further a severe competition within the walls of the Royal Academy for commissions in the Royal Engineers, while the training there, though perhaps of somewhat too special a character, is very thorough and sustained. They further go through a course of practical study in both military and civil engineering at Chatham, which in surveying especially is very complete, occupying two years. Altogether the special education of a Royal Engineer officer extends over at least six years before he becomes available for public employment. So far therefore as the principle of competition goes, it is carried out in his case to a very full extent; and without wishing to press the value of it too far, still it may at least be said that the men thus chosen ought to be, taken one with another, of more than average capacity. From the time of their admission into the department, the education of both classes afforded by professional experience is of precisely the same character.

From another point of view it seems fair to presume that, for the same cost to the State, it should be better served by military than civil officers. Military rank is in itself a very palpable mode of remuneration, and if to the one class is offered merely a certain rate of pay, and to the other both the pay and also the social advantages attending military rank, with the prospect of distinction afforded by a military career, it seems only reasonable to infer that a more able class ought to be attracted to the latter. In fact, to make the public service equally attractive to the civil officers, it would be necessary to offer them higher rates of pay than are given to the military men.

It seems needless to press the advantage to the State that, for a great department like this, which controls an enormous expenditure, it should possess the guarantee for integrity afforded by the character of the corps of Engineers. This is probably of even more importance than ability or scientific acquirements. It must be confessed indeed that the routine business and the restrictions of a government service are not calculated to develop marked professional excellence among the mass of its employees. A good deal of the work to be done is not always of a very elevating character. A large part of the department staff is not so much employed on grand engineering works, as in conserving public property, and one of its primary duties is to guard the public purse; to keep works in order, and to make a little money go a long way. Duty of this kind is not calculated to produce Brunels and Stephenson, nor is a corps of such men wanted. What the requirements of a great department like this—occupied in the maintenance as well as execution of work—are calculated to produce, and what they demand, is a reasonably high level of average ability, and a general high sense of public duty. It may be safely asserted that this standard has been very successfully maintained under the old system, conducted mainly by military officers; and further, that the members of the department while it was thus constituted

have identified themselves thoroughly with the interest of Government, and have made economy a ruling principle in their work —by no means a common thing in civil engineering. To which may be added, that the military engineers have been satisfied to accept a comparatively subordinate position in the public service, and, while employed in a civil capacity, to be remunerated at much the same rates as their comrades in the military staff departments. Whether the officers of a purely civil service would be satisfied with the same conditions seems at least doubtful. The tone of the young civil members seems to warrant the contrary opinion. Judging from the correspondence maintained in the Indian newspapers, as well as in the English professional journals, a large number of these officers seem to be occupied in a ceaseless agitation for higher pay and larger privileges, which the concessions already made seem to have no effect in allaying. Under present arrangement the civil and military members are on the whole on the same footing as regards emoluments; for although the emoluments are not identical, since the military members are paid by a staff salary in addition to their regimental allowances, while the civil members receive a consolidated salary, still the difference tells both ways; in some grades the military and in others the civil, are somewhat better off the one than the other;* the existing scale however would appear from the agitation going on to be far from sufficient to satisfy some of the civil branch. Of course no one would suppose that the whole body is responsible for the sentiments of some of its members; but I fear it is incontestable that the esprit de corps of the department in respect of its contentment and cheerful loyalty has been of late years fast undergoing a change.

Lest it should be supposed that the writer is necessarily biased on this point, it may not be out of place to advert here to the fact that at a time when the civil members of the department were really at a disadvantage with their military brethren in respect of allowances, he was one of the first persons to bring the subject to the notice of Government, and that the scheme lately carried out, by which the Public Works officers are placed generally on the same footing as regards emoluments, was initiated by him in conjunction with Colonel Strachey. Being himself the head of a branch of the department which is open equally to both classes, it must be his duty as it is his wish to avoid scrupulously all bias of feeling. But impartiality does not require that facts should be ignored, and to admit that, under present arrangements, the mode

* The grade in which the civil members are at the greatest comparative disadvantage is that of assistant engineer, and they argue that two men should not be paid at different rates for doing the same work. The fallacy of this argument is in assuming that because two men are similarly employed, their services are equally efficient. The fact is that while the military officers entering the department have usually been already for some years employed more or less in responsible duties under Government, and, especially in the case of line officers, have an adequate knowledge of the language and country, their younger civil members come usually fresh from their pupillage, ignorant of the language and often with all their practical experience to get. On the other hand, a captain of engineers or superintending engineer may receive considerably less than a civil officer in the same grade.

of supplying civil and military members to the department is likely to produce equally good men in each class, would be to ignore the probabilities indicated by the facts. Moreover, it has to be observed that the argument here proposed is not for introducing any novelty, or for forcing the Royal Engineers into a new position, but simply in effect for maintaining the state of things heretofore obtaining. The real point at issue is in fact whether the Engineer corps is to retain the position it has so long and honourably held, or to fall into a subordinate element of this great branch of the public service.*

It may be replied that these considerations, if valid, point to the advantage not only of retaining the existing proportion of military officers, but of giving them a preponderance in the department. If the military officers be the most useful agency of the two, then, it may be asked, why not return to the old state of things, and have an entirely military staff for this as for so many other Indian departments? But not to mention that this would involve an increase to the Engineer corps, greater than could in practice be effected, there are many forcible advantages in employing a mixed agency, two of which may be just mentioned here. A great department like this, if composed wholly of a military staff, would inevitably tend to become a purely seniority service, such as it used to be in earlier years, and this would be fatal to its efficiency. A still greater objection from a professional point of view, lies in the separation it would tend to foster between the two great branches of the profession. So long as these are kept apart from each other, employed upon different duties, the cry will always be maintained, whether or not it be founded in reason, that there is an innate difference between the professional abilities of the 'civil' and the 'mere military' engineer; and were the body which has the entire control of the professional press in this country to be excluded from the great field of employment afforded by the Indian Public Works Department, the proceedings of that department would inevitably be subjected to a hostile criticism very difficult to repel. But officered as it now is by a staff composed indifferently of military

* It must be remembered that although the department is now (or was a year ago) officered in nearly equal parts by military men and civilians, the latter being a late addition are principally, as yet, in subordinate posts, and that the former still occupy a vastly more important and influential position than the relative numbers would indicate. The full effect of the change taking place in the composition of the service has therefore not yet been manifested. This is clearly shown by the subjoined table.

Public Works Establishment, February, 1867.

	Chief Engineers.	Super- intending Engineers.	Executive Engineers.	Assistant Engineers.	Total.
Royal Engineers .	11	25	111	57	204
Other Military Officers	1	4	60	29	94
Civil Engineers .	—	4	119	181	304
Total .	12	33	290	267	602

and civil engineers, it offers an admirable apparatus for dissipating the feeling of jealousy which has heretofore been too often exhibited by the one towards the other; while the military engineers, now that they have found a common field of employment with their civil brethren, may enter on the course of honourable rivalry it presents, with every confidence that the reputation of their corps will not suffer from the competition.*

The foregoing remarks have been addressed to the subject from the side of State interests; there still remains to urge the importance of making the excellent field for instruction and experience, afforded by the Indian Public Works Department, available to the fullest possible extent for the corps of Royal Engineers. That corps is primarily organised and maintained for purposes of war, and no doubt its military efficiency should be the first consideration. But war is happily an exceptional occurrence, and in time of peace adequate military employment cannot be found for the whole corps. Only a minority of the officers (I am speaking of the British establishment) are attached to the engineer soldiers, and with the depots and schools of instruction; the remainder are chiefly employed under the War Department, in charge of the various fortifications and military buildings in England and abroad, and although these duties may be very necessary and financially very important, it will probably be admitted that the mere conservancy of buildings does not form a particularly useful or elevating training for an engineer. Just at the present time, indeed, a large number of officers are engaged on the great fortifications now erecting in Great Britain and elsewhere, and it may be freely admitted that these works, both from their national importance and professional nature, take precedence of those undertaken in India, which, however extensive, are yet stamped with the note of provincialism. But such opportunities occur only once in a century, and the present one will shortly come to an end. Speaking generally, it will probably be admitted that the routine duties of the Royal Engineer Department are ordinarily of a kind which would be sufficiently well performed by a much less highly trained agency, and that if an officer employed in it becomes a skilful and accomplished engineer, his proficiency will have been acquired by special means and not in course of his regular departmental occupations. This defect in the condition of the corps, hitherto inherent in the circumstances of its organisation, the Indian field of employment offers itself opportunely to remedy.

There are, however, perhaps some and those members of the corps themselves—who, while admitting this, will yet contend that it is not desirable a military body, like the Royal Engineers, should be more fully employed in peace time, and that at any rate they should not be employed in a civil capacity. To some minds

* The Public Works Department has so far laboured under the deficiency that it affords no experience in the great school of railway practice. But this will be remedied now that the Indian Government is about to undertake itself the construction of railways, since it may be taken for granted that both branches of the department will be employed on the staff of these works in the usual proportions.

there appears to be an incongruity in employing military men on other than military duty; but this objection surely arises from a confusion of ideas, in mistaking the means for the end. An army is a necessary evil, and if the members of it could still be employed as private citizens in time of peace, the gain would be unquestionable. Unfortunately this is not found to be practicable, and in order that troops shall be efficient for war, it has been necessary (at least in modern times) to keep them always in a state of preparation and training during peace. But this, if a necessary condition, is not in the nature of things a desirable one, and that in the case of engineer soldiers, there should be such a connection between their civil and military pursuits, that the one forms a useful preparation for the other, is a state of things which, so far from telling against this mode of employing the engineers, might even perhaps be usefully imitated in all other branches of the army.

Unfortunately, as has been observed, this employment of even the engineers has only been practicable to a limited extent, because the British Government does not undertake the direct execution of public works on which it could employ them. But the Indian public works now thrown open to them offer an almost illimitable field for their employment, in every way calculated to develop their professional faculties in the highest degree. That the efficiency of the corps is likely to be increased by being thus fully actively engaged in peace time can hardly be contested, while it may be noticed that a state of war almost certainly causes a check to the progress of public works, and that thus the staff employed on them will be set free without inconvenience just at the time when they are wanted for military duty. It is inconceivable, for example, that England should be engaged so extensively in hostilities in any part of the world as to demand the services of a considerable body of engineers without the financial pressure consequent on a state of war extending to India. From this point of view the employment of the military engineers is recommended on grounds of economy. To which it may be added that the augmentation of the corps, which the demands of the Indian public works will necessitate, if it is to maintain its present place in the departmental staff, might serve to meet a difficulty now beginning to be seriously felt, of the stagnation in promotion throughout the regiment. So long as the Engineer corps in India belonged to the Indian army, a practical limit was placed on augmentation by the tradition that promotion should proceed at an equal rate throughout the entire establishment. But under the new system of promotion adopted for the Indian army, its officers have already outstripped their contemporaries in the engineers in most grades, and are likely to do so still more as time goes on. At any rate there is no fear of their supersession by the engineers under any augmentation of the latter that is likely to be made.

The question therefore has to be asked whether, so far as the corps is concerned, it should not gladly embrace the opportunity

thus presented for so large a development of its functions, and whether instead of merely accepting the reversion of the place heretofore occupied by the Indian regiments, and that as it were under protest, as a kind of exceptional and unwelcome duty, it should not lay itself out heartily to occupy the new field of employment now thrown open to it? At present, indeed, less than one half of the corps is serving in India, but if the Engineer corps is to continue to occupy its present place in the rapidly expanding Indian service, it is plain that these proportions must shortly be reversed. Under this expectation it will be at least not inappropriate to review its organisation and procedure, and to adapt them, so far at any rate as may be practicable without sacrifice of any essential principle, to harmonise with the extended functions it will be called upon to fulfil.

It seems the more desirable to draw attention to the subject, because unfortunately the idea of Indian service under the conditions at present attached to it appear far from being altogether welcome to some members of the corps. Now although the position of the corps in India is, I believe, susceptible of improvement, still the objections which are made by officers of the Royal Engineers, so far as I am acquainted with them, appear to be in many respects founded on a misconception as to what that position actually is, and, since it would be desirable if this could be clearly explained, a few remarks will be submitted on this head. I will conclude this Memorandum by suggesting some points in which I venture to think the Indian system might be modified without inconvenience—in some cases with positive advantage—to harmonise with English practice.

Mode of Remuneration.—One objection, made by an officer of the corps, lately holding a distinguished official position in India, to our system, was that it was contrary to regimental custom and to proper military ideas for officers of engineers to be paid extra salaries in addition to their regimental allowance, for merely doing their duty. This view, however, is based entirely on a misconception. The officer in question seems—from the memorandum drawn up by him—to have overlooked facts very material to the case. An engineer officer in India no doubt receives a ‘staff’ salary, as it is termed, in addition to his regimental pay whenever employed in any capacity, but it needs hardly be pointed out that he also receives extra pay in every other part of the world, only the allowance is styled by a different name. So far from the aggregate salaries of the engineer department in India being excessive, they are comparatively smaller than in the colonies. In the colonies an engineer receives double the pay of a line officer; he gets nothing like so much in India. Every officer of the Indian army receives additional allowances while actively employed, as well as those of the engineers. A lieutenant-colonel commanding a regiment of native infantry, for example, receives nearly as much as an engineer holding the post (usually filled in that rank) of superintending engineer. Compared also with the staff departments of the army, brigade, general staff, commissariat,

and so forth, the engineer salaries will certainly not be found excessive.

As to the proposal emanating from the same quarter, that engineer officers should take only the departmental duties of military stations, those engaged on civil works being seconded as supernumerary, or non-regimentally employed, it may be sufficient to observe that in India there are few fortifications or special military works to develop scientific military engineering, and that the Sapper element of the army is there on a most attenuated footing. Just at the present moment there is certainly a great military undertaking in progress, in the construction of new barracks for the European garrison on a very extensive scale. But this, like the fortifications of England, is a special and temporary affair, which will not be repeated; and, once completed, the military part of the departmental business will consist mainly in repairs and conservancy of the most commonplace kind. Indian practice would under such circumstances be more monotonous and less improving than that to be had in every other part of the globe, and the corps, if limited to such duties, would inevitably sink in professional ability and professional estimation; in fact such a change would strike a fatal blow at its efficiency and prestige.*

Another objection to such a proposal is, that the number of military engineers who could be usefully employed on the so-called military duty in peace time would be quite inadequate to meet the demands of war. India has no fortresses to occupy engineers during peace, such as afford employment for the engineers of continental nations; but there is hardly any limit to the number that could be employed when the army takes the field. A reserve of engineers is therefore wanted to be kept up, and this the present system very conveniently supplies, even from a purely military point of view.

Charge of Money.—Another objection appears to be that engineer officers are placed in charge of money-chests. The objection here is not, it may be presumed, to the amount of responsibility involved, but must have arisen on the score of such a duty being incompatible with the position of engineer officers. If such an idea be entertained, it arises, I venture to think, from a misconception of what is implied by the imposition of this responsibility. The traditions of Indian administration have always assumed that the charge of its treasuries should be deemed a post of honour, so to speak, to be confided to officers of high position; and accordingly it was long customary, in places where a civil treasury was established,

* It is just possible there are some of my brother officers who may say that this would not matter, because they don't want to be good civil engineers, but to be soldiers only. To such I have no argument to offer, because the man who cannot see that the tendency of modern military science is daily towards the greater employment of the engineer's art, and in its most complex and highly developed form—so that to be a good engineer soldier one must also be a skilled engineer—occupies ground which is not to be reached by argument. But I would ask such a person, if there be one, how he would propose to employ fifteen battalions of engineers, or one fourth that number, as soldiers, in peace time?

to place the senior administrative officer in charge. Thus bills on the diplomatic agencies used always to be drawn on the residents of the native courts, these being the most important officials in the country, and until quite lately the fiction was retained that the Governor-General himself had charge of the treasury of Fort William, the officer actually in charge—one of the senior civilians in the service—being styled *sub-treasurer*. This shows what are the traditions on the subject, but in fact the point is not any longer one of practical importance, because departmental treasuries have been abolished except for petty disbursements, and the engineers have banking accounts with the civil treasuries, and make their payments by cheques. Whenever special circumstances—as, *e.g.*, distance from a treasury—require a departmental chest to be kept, the engineer is allowed the aid of a responsible treasurer.

Departmental Accounts.—It appears to be supposed by some officers, that these are a special difficulty in India. The notion may perhaps have been acquired by the officers who served in India during the mutiny, and so have spread through the corps, and certainly they were justified in any opinion they may have formed, for nothing could have been worse than the state of the accounts at that time. The beginning of reform made in 1854, upon the antiquated and defective system of the old military board, had been checked by the outbreak of the mutiny, and an epoch of the extreme confusion and delay had supervened, far worse than that which had gone before. No definite system of accounts had been prescribed for disbursing agents, the audit was dilatory in the extreme, and officers, while personally liable for retrenchments, could with difficulty ascertain what their pecuniary responsibilities were.

But this state of things has since undergone an entire alteration, and nothing can be more unlike than the present system and condition of the accounts and the past. Every disbursing officer now obtains a final clearance of all his disbursements, month by month, within a few days of rendering his accounts, and the obnoxious personal retrenchments have been abolished. Extravagance or carelessness in building is dealt with on the merits of the case, like any other professional matter, but an officer is not called on to pay out of his own pocket for loss of public money, or excesses over estimates incurred through his fault, and in this respect, if I am correctly informed, he is on a better footing than his brother officers serving elsewhere. As to the accounts themselves, whereas formerly there was no defined system, the rule and forms are now so precise that a man can hardly make mistakes, while a trained accountant is attached to every executive division, who is responsible for the correct preparation and compilation of the accounts.*

* The Public Works expenditure for all India is finally booked in the central office, and the Accountant-General's books balanced for each month monthly, within three months of date; the audit and adjustment is therefore probably as rapid as in any part of the world. This, however, is a secondary matter as regards the disbursing officer.

Objection that the Public Works Department is a Civil Department of the State.—This seems to be an objection with some, who consider that, as a military corps, engineer officers should be always on a military footing; but it really seems when looked into to arise out of a misconception of the case. The Public Works Department is no doubt a civil department of the State, but so is the English War Department. Its head and the principal officers under him are usually civilians; and, which is very material to the point, an officer serving under it does not become amenable to the penalties of the articles of war in respect of his departmental functions—as, *e.g.*, for unskilful building or careless surveys. His military status is in fact not determined by his being under the War Department, in which respect he is under precisely the same conditions as the various civil officers attached to it—storekeepers, clerks of works, &c., but in virtue of his commission as an officer.

It will be urged, however, that the Royal Engineers of the British Establishment, although performing civil duties under the War Department, are also directly under the orders of the Commander-in-Chief, and that their reliefs, roster for home and foreign service, and so forth, are regulated, not by the War Department, but by the Deputy Adjutant-General at the Horse Guards, and that in this way their military character is sustained. This dual system is, however, not practicable in India, because the Indian Government has always retained direct control of all the army departments; these, *i.e.*, the Ordnance, Commissariat, &c., are under the Military (Indian War) Office, and are not directly subordinate to army head-quarters. The utmost change therefore that could be effected in this way in India would be to transfer the control of the corps from the Public Works to the Military Department, that is, from one civil authority to another.* But the executive engineer of an Indian military station, although responsible for his departmental duties to a civil authority, is virtually on the staff of the general commanding; his whole business is intimately connected with the service of the troops; and which, I would ask, is really doing most of a soldier's work, a man nominally in civil employ, at a place like the Peshawur frontier, where there are 10,000 troops equipped for active service, with the duties of which he is immediately associated; or an officer in charge of the barracks at some West India island, or remote colonial station, where, although ostensibly employed in a military capacity, he is perhaps the only soldier in the place?

Objection that Departmental Promotion is not regulated by Seniority.—This would appear to be a great stumbling-block

or executive engineer. The great relief to them has been afforded by the introduction of a definite procedure, the formation of an establishment of trained accountants, the abolition of personal retrenchments, and the opening of banking accounts with the district treasuries.

* The Military Department of the Indian Government is borne on the civil estimates. The superior staff is composed of military men, but so, for the matter of that, is the staff of the Public Works Department. This, however, is merely an accident, so to speak; in early days the military secretary used to be a civilian.

with many, and yet when looked into the objection appears at most a very unsubstantial one. It is contrary to military principles, say those who entertain this objection, that a senior should be required to serve under a junior. But it will be apparent that this proposition requires to be largely qualified before it can be accepted as correct, even from a purely military point of view; at any rate the terms senior and junior must be employed in a very elastic sense to fit in with it. Clearly regimental seniority does not establish a claim which can never be set aside, because the purchase system is based on the principle of allowing juniors to supersede seniors in the freest way. Again, in the case of officers exchanging, we frequently see seniors serving under juniors. There are further the exceptions caused by brevet rank, when a senior in the army serves under his junior. But, it may be replied, these exceptions merely prove the existence of the rule for which we contend, namely, that precedence in a regiment is determined by regimental rank only. But in the Engineer corps the precedence of the general officers is now determined by their army rank as colonels, and a man is thus liable to be commanded, even regimentally, by one who has for the greater part of his service been junior to him, so that even the idea of relative rank by regimental seniority does not hold good universally. There is, moreover, the case of the Crimea, where the line officers attached to the Engineer Brigade and the Engineers took precedence under an arrangement determined neither by army nor regimental rank. In the Army Departments, moreover, the seniority rule by no means universally holds good, the Adjutant-General, for example, need not necessarily be the senior of his deputy; and—which is a very pertinent illustration—in the Indian army as now constituted officers take precedence in their regiments neither according to seniority of their regimental nor of their army commissions, but simply according to the pleasure of the Commander-in-Chief.

It seems clear, therefore, that the rule of regimental seniority, as applied to the duties of the Royal Engineer Department on the British Establishment, is not, as some would appear to think, a practice intrinsically proper from the nature of things, but one which is in great measure arbitrary, and might be altered without any violation of the military code. And as regards the Indian Public Works Department, the departure from a system of precedence by seniority is sufficiently explained by its peculiar organisation. Its staff is not wholly composed of engineer officers, or even wholly of military men; and if it be said that in the case of a mixed service, army rather than regimental rank should determine the claims of seniority, how could such a rule be applied when half the members of it are civil officers, and the whole are distributed indifferently among the various situations to be filled? To which may be added that in any employment which demands intelligent and difficult service from its members, the higher appointments must necessarily be filled by selection, if they are to be filled with efficiency, and this can only be secured either

by putting juniors over seniors, or by shelving the latter entirely; which of these two plans is the least expensive as well as most considerate to those concerned needs hardly be said. It may further be noted that the present system has been adopted after full trial of the other. In the earlier days of the Department, before any considerable public works had been undertaken, and its duties were principally confined to the mere conservancy of public buildings, the rule of seniority in promotion was rigidly maintained. At this time the Department was officered in effect only from the Engineer corps—the line officers employed in it being comparatively few in number, and regarded as supernumerary, while there were no civilians. When, however, extensive public works came to be undertaken, involving the application of exceptional skill and energy, the seniority system was perforce abandoned, in fact it broke down when the smallest strain was put on it.

But while thus contending for the principle, it would quite mislead the reader were he given to suppose that cases of seniors serving under juniors are at all frequent. What most commonly results from the system is not that a junior is put over a senior, but that juniors get the preference for select appointments and quicker promotion; but the department being so large, and employment in it scattered over the whole breadth of the country, this can easily occur without regimental ranks coming into collision, and a system of selection of this sort, it need hardly be remarked, is not unknown in England, where the commands of districts and the superior appointments at head-quarters are not always given to the seniors. In fact it may be asserted that the case of an executive or superintending engineer being regimentally junior to an officer departmentally subordinate to him has probably never occurred, and it is only in the highest appointments that the thing is even likely to happen. The grade of superintending engineer (equivalent to that of commanding engineer of a district) is the highest to which an officer in ordinary course can claim to rise, and the head departmental post of chief engineer of a province being filled up purely by selection, a superintending engineer may certainly be liable to find himself under a regimental junior. But the chief engineer is also secretary to the provincial government, and the orders issued from his office are usually issued not in his own name, but under the authority of the Governor, which of course does away with all idea of supersession, the chief engineer being thus as it were the vehicle for conveying the orders of the Government to the Department.*

It may however possibly be argued in rejoinder that, admitting these facts to show the necessity for maintaining the system of selection in this department, and that regimental supersession but seldom occurs, they only prove the unsuitableness of service in this department for the Royal Engineers, to whom the

* In some provinces the secretary is not also styled chief engineer; the superintending engineers in such parts are thus the departmental heads, and the question of precedence does not arise at all.

idea is obnoxious that a senior should be liable to serve under a junior. Whether the principle they contend for be really inviolably maintained out of India, the considerations already offered may perhaps render at least doubtful, while it has been explained how small the liability in India actually is; but however that may be, is not the objection in this case after all merely an imaginary one, based on an ambiguous use of the idea of 'serving'? From the way in which the matter is sometimes spoken of, it might almost be supposed that the claims of departmental business involved some liability to subvert the proper precedence of officers in purely regimental duty, whereas in fact the two things have no sort of connection. Departmental duty is purely civil duty, and nothing done in it can form the subject of reference in a military court, so that really there need not be more question of one's military rank while road or canal making in the department, than there is in the hunting-field or at one's club.* The fact is that the officers of the Public Works Department are for the time being, *quoad* military status, in the position of private citizens; their military rights are not subverted but are merely suspended temporarily, as happens when they take leave of absence. The ties of departmental precedence do not extend beyond departmental business, and never conflict in any way with the claims of regimental duty, and they terminate with the cessation of departmental employment. The arrangement, it may be added, is one quite familiar to the corps, in the case of the officers attached to the Board of Trade and other civil departments: the only point exceptional in its application to the India Service is the great extent to which it is there carried.

Lastly, to those who, while approving of the practice, yet object that it is carried too far, it may be sufficient to reply that it is not found in practice to produce any inconvenient results. Men do not lose sight of their relative military functions because in peace-time they are not exercised, but when the troops take the field, the engineer officers told off to accompany them pass at once from the orders of the Civil Government to those of the Commander-in-Chief, and fall, as a matter of course, into their proper regimental places. No army enters more readily on a state of war than the Indian army, and no body of officers understand more thoroughly the rules of military obedience than those of the Engineer corps; the supposition that any misapprehension as to the claims of military subordination is likely to arise from the Indian departmental system is sufficiently refuted by reference to the testimony of the past, and with all the experience afforded by past Indian campaigns, *à priori* objections as to its supposed tendency are surely not entitled to weight. That system has not been found to interfere with the military efficiency of the corps, which bears an undeniably high reputation among the Indian services, and its most distinguished members have been men employed wholly during

* A man may of course become amenable to the articles of war for conduct unbecoming an officer or a gentleman, arising out of departmental affairs, but so would he equally become liable for the consequences of similar conduct if exhibited in his own drawing room.

peace time under the departmental system. What as I venture to think are some defects of our organisation will be pointed out presently, but assuredly the abolition of promotion by seniority in the Public Works Department is not one of them.

Possible Modification of System.—At the same time the difficulty which our system creates in some quarters would undoubtedly be removed by the adoption of a scheme, drawn up by Colonel Strachey and myself a few years ago, in a Memorandum submitted to the Governor-General on the employment of the corps of Royal Engineers in India. To make clear the nature of the change proposed, it may be briefly explained that under the existing system the public works, military as well as civil, of each of the ten provinces which make up British India are dealt with by the civil government of the province, and are provided for in the provincial estimates as submitted to and finally approved by the supreme government. The head departmental ministerial officer in each province is the chief engineer, who is also secretary to the provincial government. The larger provinces again are subdivided into circles, each under a superintending engineer, to whom the executive engineers of divisions are immediately subordinate. A division of public works usually covers a considerable area of country, comprising one or more civil districts, within which the executive engineer has charge of all the public works and building except works of irrigation; it may thus consist of a group of civil and military stations, and the roads uniting them; but the more important lines of road are usually formed in separate executive charges, and the large military stations have also in most cases been constituted executive divisions by themselves. Irrigation works also form a special branch of the Department; in the larger provinces there are a separate Chief and Superintending Engineers for the Irrigation Department, and everywhere the Executive Engineers of divisions of irrigation works are employed wholly in that line. Thus the line of demarcation between the different kinds of duty is already marked with tolerable distinctness; but in the Memorandum referred to it was proposed to carry the separation still farther—to relieve the executive engineers of military divisions entirely from the charge of civil works, and to form separate circles of these military divisions, the general superintendence of them being placed upon the Inspector-General of Military Works—an office lately created and attached to the Supreme Government—the superintending engineers of these Military Circles, which were to correspond in extent, so far as might be practicable, with the army divisions, being styled Deputy Inspector-General. The relations of these officers to the civil provincial governments, and the amount of control which it was considered the latter should continue to exercise over the military works in their respective provinces are points which, although very important, need not be dwelt upon here. It will be sufficient for present purposes to explain that while the proposal was made with the primary object of strengthening the military administration of the Supreme Government, which has the immediate control of the army in all other

matters—the present interposition of the provincial government, in regard to military buildings, being plainly anomalous and in some respects inconvenient *—the scheme was also framed to meet the changed circumstances of the Engineer corps, on their amalgamation with the Royal regiment, and in view to removing the objections which it was believed some members of the latter felt to our departmental system. It was a part of the scheme that this military branch of the Department should be filled only by Royal Engineer officers, the Inspector-General being an officer of standing, and the Deputy Inspector-Generals regimental field officers, and that all officers of the corps on first joining the Department should be attached to this branch of it, and be transferred to the civil branch only at their own request. The latter being much the larger of the two, it would obviously be easy to arrange that in the former the order of departmental precedence should correspond with that of regimental rank, while in the latter promotion would continue to be determined by selection only, as at present ; but since the officers serving in the civil branch would do so at their own desire, they could not object to the system maintained in it, while the military branch would be large enough to contain the remainder, and all parties would be employed on terms agreeable to themselves.

The untimely death of Lord Elgin very shortly after this Memorandum had been submitted to him, combined with other circumstances to prevent this scheme being deliberately considered, but the proposals are as applicable now as then, if in themselves desirable. But while now drawing attention to it, I feel bound to point out one very serious objection attaching. If, instead of an indiscriminate distribution of the departmental staff among the different posts to be filled, as now obtains, when consequently the military charges are held indifferently by civil and military officers, the latter again being drawn from all branches of the army, those charges are to be held entirely by officers of the Engineer corps, the latter must obviously recede considerably from the share they would otherwise hold of the civil appointments; and since the civil works form unquestionably the better school of engineering practice, the change would inevitably be attended by a deterioration in the professional accomplishments of the corps. The barrack divisions, in fact, when the great buildings now under construction shall be completed, will really offer no facilities for acquiring experience except in the most commonplace routine of ordinary building work. Whether the change would be desirable as increasing the control of the Supreme Government over its military expenditure is another matter, but regarded merely as a corps question, and seeing how very seldom it is that cases of regimental supersessions actually occur under the existing system it would surely be a heavy price to pay for an idea.

Another objection to Indian system stated.—One more objection

* The governments of Madras and Bombay have a partial control over all the military arrangements of the troops stationed in those provinces, but the remarks in the text have reference more especially to the other eight provinces of India.

has been noticed, which, although relating to a point of detail, appears to have been very strongly felt. I refer to the article in the Public Works Code, which rules that departmental seniority is always to regulate precedence,* so that in the event of a warrant or non-commissioned officer happening to be temporarily the senior officer of a division, he would be entitled to assume charge of the office, any commissioned officer of junior departmental rank being relieved from departmental duty for the time. As one of the persons principally concerned in the compilation of the Revised Code, I may perhaps venture to say that I think this paragraph a most unfortunate one. It is, I believe, perfectly needless, since the case of a non-commissioned or warrant officer being a senior departmental officer, or even an assistant engineer at all, is one hardly likely to occur, and might at any rate have easily been provided for otherwise, without inflicting hardship on anyone, and without straining the principle of departmental precedence as this does in an extreme degree, for the enforcement of a mere idea. But were it understood what a sensible objection this clause now constitutes to Indian service with many members of the corps, and that really no one is interested in maintaining it, it is hardly doubtful that the Code would undergo the needful modification.

Defects of Indian system. Insufficiency of Regimental Work.—Having said so much regarding the advantages offered to the Engineer corps by Indian service, a few remarks may usefully be added regarding those conditions of it which appear defective, and which are, moreover, I believe, readily susceptible of improvement. If the extensive practice in civil engineering in peace-time offered by India be a good thing for the corps, on the other hand there is undoubtedly a tendency to carry this mode of employment somewhat too far, and to neglect to maintain the needful degree of military preparation and training. With rare exceptions, a young officer after a short tour of duty with the native sapper battalion of his presidency is transferred to the Public Works Department, and never returns to military duty again. It cannot but happen that in course of time his military knowledge must grow rusty, and if it be replied that officers suddenly called into the field after long

* The article (chap. iv. sec. i. art. 34) is as follows:—No Public Works officer of any grade shall be deprived of the advantages of his position in the department by reason of the superior military rank of any departmental junior. But a commissioned officer cannot be compelled to serve under a warrant or non-commissioned officer, nor a warrant officer under a non-commissioned officer; and in any case where a warrant or non-commissioned officer takes charge of an office by virtue of a departmental seniority, any commissioned officer of the division may consider himself relieved from departmental duty. Likewise a warrant officer may consider himself relieved when a non-commissioned officer takes charge. But no commissioned officer can refuse to serve under his departmental senior, being his junior in the army, and also a commissioned officer; no warrant officer under his junior in the army, being also a warrant officer, no non-commissioned officer under his junior in army rank, being a non-commissioned officer or soldier. No commissioned, warrant, or non-commissioned officer can refuse to serve under his senior in the department, being a civilian, nor can any civilian refuse to serve under his senior in the department, of whatever military rank. It will be the duty of chief engineers to arrange so as to the best of their ability to prevent the possibility of any commissioned or warrant officer being thrown temporarily out of departmental employ under the above rules.

absence from the regiment as a matter of fact acquit themselves creditably, and that, therefore, the plans work well in practice, the rejoinder is obvious that they would do still better if afforded the opportunity of undergoing a periodical military training, or at any rate of occasionally exercising themselves in military technical subjects. On this point there can hardly be any reasonable doubt, and although some men may prove on such occasions superior to circumstances, systems are not required for men of genius, and the majority of those who have found themselves in such a position would probably frankly confess their deficiencies, and admit that whatever might have been their success, it was achieved in spite of, and not because of these.

It may be replied that the condition of things here objected to is, after all, only similar to what obtains in the British establishment of the corps, in which officers, although nominally employed in a military capacity, are often detached during their whole period of service from the engineer soldiers, and employed on duties which have no bearing on their military education, nor tend to enhance their usefulness for purposes of war. This may be so, but the difference in the two cases is that in the British part of the corps a strong nucleus is always retained on purely military duty, the officers of all grades attached in succession to the Chatham establishment alone being sufficiently numerous to leaven the whole regiment, while in India the military element is practically wholly wanting. The Sapper corps in no way answers the purpose, as there is no place with them for any but juniors, and only a few of these. The Bengal Sapper battalion has certainly of late years been placed on an improved footing, a special staff of instructors having been appointed to it; but besides the subalterns there is only one first and one second captain doing regimental duty, and not a single field officer. The commandant of the Madras and Bombay battalions is an engineer officer, but the companies are officered from the line, and the staff consists of an adjutant and quartermaster, also usually line officers; in this respect they are even worse off than the battalions of native infantry, for these have each four staff officers. Altogether only four engineer officers above the rank of lieutenant are employed in a military capacity, out of 336 borne on the Indian establishment.*

To meet this defect it was proposed in the Memorandum already referred to (by Colonel Strachey and the present writer), that the strength of engineer soldiers stationed in India should be considerably increased, the three native Sapper corps being placed on an improved and more efficient footing, and a Commanding Royal Engineer for India with staff appointed. It was also suggested

* From the latest army lists available the engineer officers attached to the Sapper corps appear to be as follows:

	Field Officers	Captains	Subalterns
Bengal		2	11
Madras	1		4
Bombay		2	
	1	4	15

that every officer on promotion to captain and field-officer should be required to return to regimental duty for a season. It is indeed not a little remarkable that in a country where our military supremacy is avowedly based on the quality rather than the quantity of our troops—the artillery being wholly European, and maintained at an exceptionally high strength, and our European infantry armed much better than their native comrades—even the usual contingent of engineers considered needful in European armies should be altogether wanting. The establishment of an adequate European engineer force for India is, however, a larger question which could not be conveniently followed up here,* and the introduction of a roster of military duty to be taken up by each officer on promotion might be attended with practical difficulties, which there is not room to discuss in this paper. But the rest of the scheme might be easily carried out. Already something has been done in this direction by the new organisation of the Bengal Sappers already referred to, and the formation of a company of Europeans at the head-quarters of each corps.† A similar organisation for the Madras and Bombay battalions still remains to be carried out, as well as the establishment of a regimental head-quarters and staff for the whole corps in India.

As regards this last proposal, and the appointment of a Commanding Royal Engineer, it seems sufficient to observe that the seven battalions of the corps stationed in India are at present absolutely without any local head, or any medium of communication with the authorities in England, and that there is not a single officer in that country, save the comparatively junior men attached to the native Sappers, responsible for any military duties which may arise in time of peace, and for the preparations necessary that the corps should take the field in a state of efficiency on the outbreak of war. As to the first point it needs hardly be said that in a country like India questions connected with military engineering must constantly arise, but at present there is no one specially responsible for dealing with them, as the professional adviser of the Commander-in-Chief. Should the question arise, for example, of the construction or alteration of a fortified post in any part of the country, the superintending engineer of the circle, upon whom, under present arrangements, would devolve the needful preparatory measures, may possibly not be an engineer, or even a soldier. The Inspector-General of Military Works, an engineer officer of standing, is no doubt charged with a general supervision in such matters, but his action comes in as that of final referee and adviser of the Government, more particularly as regards cost. There is no one specially responsible for *initiating* proposals connected with the defence of the country, or for advising the military authorities that the fortified posts throughout it are maintained in a state of efficiency.

* An extract from the Memorandum is given as an Appendix.

† This company is however a mere depot, ostensibly kept up to feed the subordinate ranks of the Public Works Department, and usually consists merely of recruits and the non-commissioned staff.

Nor is it anyone's business to see that the needful engineer equipment is forthcoming for military operations. When the army takes the field all the engineering arrangements have to be improvised; at any rate the officer selected to be commanding engineer is not responsible for the state in which he finds the equipment.* He is not even responsible for the choice of officers to serve under him. The practice usually is on such occasions for the Commander-in-Chief to indent (through the Military Department) on the Public Works Department for the required number of officers, the selection of them being left to the latter; and it is to be feared that this is sometimes determined rather with reference to the interests of the public works than with regard to military requirements. No doubt in a general way men of known military capacity have been taken for field service, but in some cases those have been chosen who could best be spared, while on other occasions (within my own knowledge) a difficulty has been raised about supplying the full number of engineers asked for, and their places have been taken by line officers, presumably less qualified for the particular work to be done.† To lose sight thus of the primary object for which the corps exists, and to subordinate its military to its civil character is surely most objectionable. It is also, I venture to think, a short-sighted policy, even from a departmental point of view, because, to say nothing of the gain to the corps in prestige and therefore efficiency by distinction in the field, if we take into account the numerous casualties constantly occurring in so large a department from furloughs and sickness, the absence of a few additional officers on field service should not cause much inconvenience. But were there a responsible head to the corps, he as a matter of course would select the officers to accompany him on field service, and the principle would be more clearly kept in view, that military duty has the prior and unquestionable claim on their services, which are merely lent to the civil service in time of peace.

As to the expense of the measure, considering that a field officer is allowed to nearly every battery of artillery, a single officer of that grade to represent the purely military element of the engineer branch of the service would surely not be a very extravagant

* A small park and pontoon train are certainly kept up at the head-quarters of the Bengal Sappers, under the superintendence of the commanding officer, but the responsibility here is of a very indefinite kind, because whenever the military operations undertaken are on so extensive a scale as to call the Sapper head-quarters and park into the field, that officer is invariably superseded by some senior as commanding engineer, and falls back on the subordinate post of commandant of Sappers, the control of the park passing out of his hands. Besides, in many cases military operations have to be undertaken at a distance from the Sapper head-quarters, where its park is not available. On such occasions, until the officers selected for employment are actually called from their desks into the field, it is no one's business to see that the needful arrangements are made.

† The Umbeyla campaign is a case in point. In this instance the requisition did not come from army head-quarters, but from the Punjab government, which was charged with the preparation of the expedition. Engineer officers not being supplied by the Public Works Department to the extent asked for, the Revenue Survey Department was had recourse to for the needful reconnaissance.

allowance, even if the peace duties to be performed were not very onerous. But, beside what has been indicated as an outline of his probable duties, the supervision and inspection of the three Sapper corps, and the equipments attached to them, would be an important occupation. The material of these regiments is unanimously admitted to be excellent, but a proper organisation of the Madras and Bombay battalions has yet to be carried out ; and with regard to all three, the formal inspection of divisional generals might obviously be supplemented with advantage by some professional control.

The Commanding Royal Engineer would also naturally be the custodian of the plans of all fortified posts throughout the country, for whom no one authority is at present responsible. The commandant of Bengal Sappers certainly has an office for such records, but his duty on this head is merely to keep the plans which may be entrusted to him ; it is no part of his business to say what those plans shall be. What may be the arrangements in Madras and Bombay I do not know, but I believe the records of this kind are everywhere very incomplete. When the siege of Delhi had to be undertaken no plan of the works was to be found. The records of the local engineer's office had of course been destroyed, and no duplicate plans had been recorded anywhere. Eventually, some very imperfect plans found their way into camp, I believe from the Quartermaster-General's office. If the siege of Calcutta or Gwalior had now to be undertaken under similar circumstances, precisely the same thing would probably happen again. But it seems needless to pursue the argument. It is plain that the engineer element of the Indian army is during peace time reduced to a condition quite indefensible in a military point of view, and utterly inconsistent with the complete efficiency and organisation aimed at in all other branches of the service. The only doubt would appear to be whether the very moderate scheme of improvement suggested is adequate to the case.

Lastly, it may be just mentioned that ample occupation awaits any officer with opportunity to undertake it, in the compilation of a record of the various engineering operations undertaken in former years, especially during the mutiny. It is lamentable to think that all the experience gained on that occasion, some of it of extraordinary interest and value (as, *e.g.*, in the remarkable mining operations at Lucknow), is rapidly disappearing for want of such a record. In any other country it would have been compiled under authority, as a matter of course, but in India there is no one professionally responsible for bringing the subject to notice, and the officers employed in the Public Works Department are too busy to undertake such a work. In a short time it will be too late to make the attempt.*

Whether the duties thus indicated should be conducted with the aid of a staff officer, or whether they might not be per-

* I doubt if anyone ever knows now what has become of the detailed journal of the operations before Delhi, kept in the engineer brigade office. The book has I believe been mislaid, and it is no one's business to look for it.

formed by an officer of standing attached as Deputy Adjutant-General of engineers to army head-quarters is a matter of detail which I will not venture to discuss; it may be just observed by the way, that the latter arrangement would obviate any difficulty arising out of the relative rank of this officer to that of the other field officers of the corps employed in India.

Instruction of Officers on Furlough.—One obvious means of maintaining the military efficiency of the corps would be to require the officers employed in India to spend a part of their furlough at the Chatham establishment. There would apparently be no difficulty in arranging that this should be done in a systematic way. Such a duty, if enforced, would probably be acceptable to most, and would certainly be beneficial to all.

Reliefs.—This subject was referred to in the beginning of the Memorandum as one which requires to be placed on a somewhat more definite footing than at present obtains. Officers now go to India on the understanding that they shall be entitled to relief every seven years. Were such reliefs to be carried out systematically they would interfere seriously with the steady progress of departmental business, since officers would be withdrawn from India just as they were becoming thoroughly efficient and had acquired some experience as divisional officers. It is understood to be intended not to insist on the plan unless in cases where the officer himself desires to be relieved, but it may be observed that in every other branch of the army the minimum term of Indian service is ten years. And considering the peculiar conditions of engineer employment in that country, that a man becomes useful just in proportion as his local experience increases, and looking to the fact that, while those who have commenced professional life there will, speaking generally, desire to remain in it, those on the other hand, who are accustomed to English and colonial service, will prefer to continue in the latter, it seems worthy of consideration whether provision might not be now specifically made for meeting these conditions, and offering to the officers of the corps a distinct choice between the two lines of service. This might be done without interfering with the organisation of the corps, or the existing system of promotion, by marking off the corps, by battalions, into two divisions, for general and Indian service respectively. Thus, while promotion would continue to run in one general list, an officer would be appointed to a general-service or an Indian battalion, according as the officer whom he succeeded belonged to one or other division. This would in fact merely be to continue the practice already in force with respect to all but the subalterns appointed since 1860, except that the whole regiment would eventually belong to one general list for the purposes of promotion. In this way every officer would know exactly what his prospects were on first admission to the service, and would prepare himself for an English or Indian career, according as he found himself posted to one branch or the other; while, if exchanges were freely admitted, it is probable that every officer would practically be able to choose the

line which suited him best.* Further, it would be quite practicable, if thought desirable, to carry the line of division still further, by maintaining the four existing separate lists for purposes of promotion, the subalterns of the present amalgamated list being distributed to complete the establishment of the three former Indian regiments. There would be some obvious advantages in such an arrangement, one being that officers distinguished for service in the field might be advanced the sooner to military command, since they would take precedence when the different regiments came together, according to their army or brevet rank.

Exchanges.—But whatever plan be finally determined on, it seems very desirable that exchanges be freely permitted between engineer officers in all ranks. Until this is done it cannot be said that the amalgamation has been fully carried out. There may be a certain degree of difficulty in finding suitable employment for officers of standing, who commence Indian service comparatively late in life, but there are also manifest disadvantages in maintaining the rule lately established, which limits the power of exchange to the junior officers. A field officer of the Indian branch, whose health will not permit him to serve in India, can now only escape from that country by retiring from the service, while the senior officers of the British establishment of the Royal Engineers are the only persons in Her Majesty's army who are ineligible for undertaking a tour of duty there. It seems a pity that the broad principles of a great measure like the amalgamation should be infringed upon merely for minor reasons, and in this sense I venture to think that the rule lately introduced on this point might usefully be reconsidered.

I will conclude by recapitulating the proposals which have been indicated in this Memorandum, merely adding that if it has run to a greater length than I intended to make it, the time spent in writing and reading it will not be thrown away if there results any benefit therefrom to the cause of public works in India, and to the welfare of the corps to which I have the honour to belong.

I. To supplement the establishment of Royal Engineers now serving in India by a transfer of as many officers from the British establishment as can possibly be made available in all grades, to meet the emergent demand now existing in that country for a larger staff of engineers: this as a temporary arrangement, pending final settlement of measures for permanently maintaining the proportion of military officers in the Public Works Department at the established figure.

II. A more complete recognition of the claims of Indian service as a primary duty of the corps, and in this view either—

a. Abolition of the practice of seconding officers in the Public Works Department. Those employed out of the regular line of the department, and who are now *hors cadre*, to be borne as *supernumerary*, not as *seconded*.

* It is proper to add that this scheme is not an original one on the part of the writer. It has been proposed by a very high military authority.

- b.* The formation of separate permanent rosters for India and other parts of the world, promotion however running in one list ; or
- c.* Formation of separate lists for the two services.

III. In any case exchanges to be freely permitted in all grades.

IV. Removal of a certain paragraph from the Public Works Code. (See page 29.)

V. Appointment of a Commanding Royal Engineer for India, with a staff officer, or to hold himself the post of Deputy Adjutant-General.

VI. Development of the use of the Chatham Establishment for officers returning on leave from India.

APPENDIX.

Extract from Memorandum regarding the employment of the Royal Engineer Corps in India, submitted to His Excellency the Viceroy and Governor General. By Colonel R. Strachey, R.E., and Major G. Chesney, R.E. September, 1863. (See p. 31.)

All considerations, therefore, both departmental and military, appear to point to the conclusion that a radical change of system is required in the organisation of the engineer troops serving in India. In order that the men taken away from the regiment should be really picked men, and that the regimental discipline and its efficiency as a military body should not suffer by this drain on it, it appears essential that the European engineers should be considerably strengthened. To give sixty or seventy overseers a year to the Public Works Department, to supply other casualties, and to remain in an efficient state of discipline notwithstanding this drain, a force of 600 men will probably be admitted to be the very smallest that ought to be maintained in India.

We have so far only considered the case of the men, but it is very desirable, or rather it may be said essential in a military point of view, that a part of the Royal Engineer officers serving in India should be always employed on military duty with their men.

It may certainly be affirmed that the principle on which the Corps of Engineers has hitherto been employed in India, as military engineers in war, and as civil in peace, is unquestionably a sound one. The technical part of purely military engineering science as now practised is soon acquired, and once learnt, there is little use in continuing to practise it for a length of time afterwards; and the practice of civil engineering is infinitely more useful than ordinary military duty, in developing those qualities which are required of an engineer officer on actual service, as teaching ingenuity, readiness of resource, and the power of overcoming difficulties. On a late enquiry instituted by the Secretary for War in England the unanimous testimony of all the ablest officers of the Royal Engineers was given in this direction.

And here it is as well to call to mind that on the amalgamation of the Indian with the Royal Corps of Engineers, the tacit undertaking on the part of the British military administration has been, that as many engineer officers should be supplied for the wants of the Indian Government as have heretofore been available from the local corps. Her Majesty's Government must be understood to have decided that the occupation of Royal Engineers on the duties till now performed by the Indian Engineers, was suitable, and further that the detailed arrangements under which they were to serve should be regulated by the Government of India. On the other hand it must equally be conceded that the Government of India is bound so to regulate the duties of the Royal Engineers under its orders that their capacity for military purposes shall not be injured, and that so far as is consistent with proper economy and the true interests of the Indian Administration, their employment in connexion with other branches of the army shall not be opposed to the legitimate views of the military authorities, or the general military system of the British Army as a whole.

But it cannot be denied that under the old regime, the laxity that grew up in other branches of the military administration extended to the engineer branch also, and that the employment of the military engineers in India on civil works has been carried too far, and the military part of their duty too

much lost sight of. After a few months' duty with the sappers, often without it, the engineer officer is posted to the Public Works Department, and usually remains in that Department for the rest of his service, except when called away in war time. The Indian engineers have certainly no cause to feel ashamed of the part which their corps have taken in the numerous fields of Indian warfare; still, after a long civil career, a man's military knowledge must needs grow somewhat rusty, and every officer who takes an interest in his profession must regret that the military element of it is put so much on one side. But at present there is absolutely no place for more than two or three officers in each presidency with the sappers (excepting the junior subalterns); as matters now stand, an engineer officer must either take employment in the Public Works Department, or do nothing. Therefore the location of a few companies of the Royal Engineers in India with which the officers serving in that country should do duty in turn, would be most advantageous to the whole body.

And on purely military grounds, the necessity for a proper organisation of our military engineers does certainly seem to be imperatively called for. In fact the present state of the Indian Army in this respect is most extraordinary and anomalous. We have a very strong force of infantry, artillery, and cavalry, and yet through the whole breadth of the land, there is not a company of European sappers and no trace of a superior Engineer organisation. This is the more remarkable, because India is essentially a country in which military operations tend to be involved in the attack and defence of fortified posts. It is sufficient to refer to the annals, recent or early, of the British wars in India in proof of this assertion, and it may confidently be said that the engineer element of the army ought to be strong rather than weak, as compared with the state of other armies.

That European engineer soldiers were not maintained in a recognised way prior to the amalgamation of the armies is of course mainly due to the fact that the Royal Artillery and Engineers were both excluded from Indian service, but the artillery in India has now been thoroughly reorganised and placed on a complete and efficient footing, and it is surely time that the wants of the engineer branch of the service came under consideration.

If the foregoing remarks are admitted to be conclusive, it will probably be admitted that a force of six companies of engineers, or 600 men, is, on all grounds, the very smallest that ought to be maintained on the Indian Establishment. And this is also the smallest force which has been shown to be necessary on purely departmental grounds.

The nucleus on which four companies might be formed already exists in the men now attached to the Sapper Corps,* who, as has been stated already, are not now formed in any sort of organisation. All that would be necessary would be to make up their complement to the full strength, and to send out two more companies from England.

It may be assumed that four companies would always be stationed in Bengal, and one each in Madras and Bombay. The four Bengal companies would probably be stationed at Roorkee, the present head quarters of the regiment. The companies should be organised exactly on the Royal Engineer system, and would be relieved by fresh ones, like all other troops, according to a regular roster every ten years. While in India they would be maintained in a thorough state of military training, and during the hot season would undergo a course of careful in-door instruction. Once a year the best of the candidates for employment in the Public Works Department would be selected to the extent of the vacancies to be filled up, their places being filled up by recruits from the depot at Chatham.

It may be noticed that this scheme does not provide for the Royal Engineer companies being actually employed upon the construction of public works in India. It is believed that every one who has considered the subject will admit

* *Strength of Europeans, non-commissioned officers, and soldiers attached to Sapper Corps, from latest returns available.*

Bengal . . .	170
Madras . . .	93
Bombay . . .	88
Total . . .	351

this to be impracticable. There are no works upon which European engineer soldiers could be profitably or healthily employed, working together in military organisation, while to scatter the men over an extended work, or line of works, as supervisors of workmen, would greatly interfere with discipline.

It is understood to have been this conviction on the part of the Government, and the opinion that they were a very costly force, which led to the withdrawal of the four companies of Royal Engineers which came out in 1857, but there appears really to be no reason why it should be held as a necessary condition of maintaining an engineer force, that it should always give an equivalent service for its cost in peace time. No one looks for this from the artillery, cavalry, or infantry : provided these are maintained in a state of efficiency in peace, and ready for war, it is assumed that they are fulfilling properly the functions required of them ; but because the engineers are often made use of in peace as well as war, the fact appears to be lost sight of that even if they were not thus useful, still it would be just as necessary to maintain them as it is to maintain other branches of the army in peace time. If, then, only the very smallest force necessary for the military requirements of the country is maintained, (and six companies would not be more than this,) and if that force is maintained as an efficient military body, and as a training school in military duties for both officers and men, it would be surely as unreasonable to complain that such a body was not defraying its own cost by executing civil works, as it would be to allege the same of the artillery or any other branch of the army.

It is obvious to remark that, considered as an element of European force in the country, the engineer companies would take just the same place as any other infantry ; thus if there were four companies at Rookree, a wing of a line regiment would no longer be needed there. While as regards the supposed high cost of the engineers, it may be pointed out that the expense for quarters, hospitals, transport, and commissariat, is precisely the same for them as for any other troops, and these are the items which make up the main cost of the army ; the only excess of expense on their account would be in the pay, and perhaps a trifle in clothing, but these are not formidable items. On the whole, any additional charge caused by the addition of the six companies of Royal Engineers to the Indian Establishment might at once be met by a corresponding reduction of troops of the line, not only without objection, on the ground of a diminution of the total armed force, but with a certain increase of strength, from the addition of an element to the British Army, which, in the estimation of every soldier, must be regarded as essential, and which at present is altogether wanting. If there be an axiom in military science, it is that the power of an army is based not on mere numbers but on the completeness of its organisation.



